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The Structure of Public Debt and the Criteria of Its Sustainability

Keywords: sustainable public debt; sustainable public finances; local government units

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Abstract

Theoretical background: Sustainable development is a wide and developing economic concept. The sustainability of public finances is one of its basic parts. Sustainable public finances are still perceived rather narrowly in terms of their impact on the financial stability of the state. Such an approach to them narrows their perception and should be extended to other aspects such as influence on social and ecological problems of development. Sustainable public debt is and will continue to be a foundation of sustainable public finances. It should be assessed as sustainable public debt, taking into account both its impact on the sustainability of public finances as well as the possibility of providing public services in the future and the achievement of economic, social, and environmental goals of sustainable development.
Purpose of the article: The article aims to assess the impact of the differentiation of legal regulations concerning the debt of the central government and the local government subsector on the level of sustainability of public debt in Poland. The paper will verify the hypothesis that the differentiation of debt regulations between the analyzed public finance subsectors has an impact on the sustainability of public debt. The unification of some regulations could probably increase the level of sustainability of public debt.
Research methods: Firstly, the analysis of legal solutions based on the desk-research principle was used in the article. Then, public debt sustainability assessment methods were used to assess the degree of sustainability of the central government subsector debt and the local government subsector debt. The stationarity

analysis of time series based on the unit root test was applied. The analysis was performed using the KPSS test. An analysis of correlation and regression between the variables of public debt and primary balance was performed. In the aspects that do not have a developed test method, it was proposed to use evaluation methods such as the European taxonomy and the analysis of quantity and value of green bond issues, the share of investment expenditure, and green tagging of expenditure.
Main findings: The conducted analysis shows that the regulations concerning the debt of the central government subsector are much more liberal. That fact has a negative impact on the sustainability of public debt. This applies in particular to the aspect of sustainability of development, where the purpose of spending the raised funds is important. On the other hand, the quantitative analysis shows that both parts of the debt in Poland are not sustainable according to the criteria of the methods. However, the debt of the local government subsector is much closer to sustainability in all three aspects.

Introduction

Sustainable development is a wide and developing economic concept. The sustainability of public finances is one of its basic parts. Sustainable public finances are still perceived rather narrowly in terms of their impact on the financial stability of the state. Such an approach to them narrows the perception of sustainable public finances and should be extended to other aspects such as influence on social and ecological problems of development. Sustainable development has the potential to be an integrated economic concept broadly related to economic problems.

Sustainable public debt is and will continue to be a foundation of sustainable public finances. It should be assessed as sustainable public debt, taking into account both its impact on the sustainability of public finances as well as the possibility of providing public services in the future and the achievement of economic, social, and environmental goals of sustainable development.

Public debt is issued by different subjects of the public sector. The central government subsector (or more precisely State Treasury) has the largest share in the creation of public debt in Poland. The local government subsector (mainly local government units) is responsible for less than 10% of public debt. Both subsectors follow different regulations in the area of indebtedness, debt management, and usage of acquired resources. It can be assumed that differences in the regulations influence the sustainability of public debt. The influence concerns the stability of the public sector, but also its durability and sustainability.

Therefore, the article aims to assess the impact of the differentiation of legal regulations concerning the debt of the central government and the local government subsector on the level of sustainability of public debt in Poland. The paper will verify the hypothesis that the differentiation of debt regulations between the analyzed public finance subsectors has an impact on the sustainability of public debt. The unification of some regulations could probably increase the level of sustainability of public debt.

The article starts with a literature review presenting different concepts of public debt sustainability. The next part presents the methodology of the undertaken research. The Discussion part presents an analysis of the impact of different legal

solutions on sustainability of the public debt of both subsectors. Then, an assessment of the debt sustainability of both subsectors is presented in terms of the consequences of the regulations. The article ends with conclusions and recommendations.

Literature review

Sustainable development is one of the development concepts currently included in the heterodox economy. Ensuring the development of society without limitation of possibility of development for next generations is the fundamental of the concept. The approach changed the way of thinking about development highlighting the significance of balance between three aspects of development: economic, ecological, and social. A change of analysis perspective from short-term to long-term is also required (Report of the United Nations, 1992). Involvement of the public finance sector is one of the crucial conditions for the successful implementation of sustainable development. It requires fundamental changes in models of functioning and aims of the sector which makes the involvement quite complicated. Especially creation of a new values system can occur a challenge. Economic activities should be evaluated based on economic, social, and ecological criteria (Fullwiler, 2015).

The sustainability of public finances is usually verified based on its influence on the stability of the state. Evaluation of the influence differs depending on the applied definition. The most common approach defines public finances as sustainable if they do not cause instability in the state. In detail, sustainable public finances should fulfill the following rules:

a) the level of public debt should be constant (relatively constant) (Trehan & Walsh, 1991),

b) three conditions should be fulfilled: there is no primary deficit, interests are paid using current revenues or budget deficit, interest rates are lower than average dynamics of GDP (Heun, 2014),

c) primary surpluses of the public sector are sufficient to cover public debt payments (capital and interest payments) (European Central Bank, 2011),

d) the public sector achieves its goals without an "explosion" of the tax burden (Biondi, 2018),

e) sustaining of undertaken politics is possible without declaration of insolvency or loss of liquidity (European Commission, 2016).

The approaches are rather general and it is difficult to indicate the point of the unsustainability of public finances. All the approaches do not include social and ecological aspects of sustainable development. Therefore, the definition can be extended: public finances are sustainable when they allow for achieving the greatest possible number of sustainable development goals while maintaining neutrality concerning other goals (Cieślukowski, 2017).

The common feature of the approaches presented above is that the basis for sustainable public finances is the sustainability of public debt. A few different definitions of sustainable public debt can be found in the literature. The basic concept defines public debt as sustainable when it is constant (absolutely or relatively constant). The main measure of public debt stability is the stationarity of the time series. It can be verified using unit root tests and statistical tests like ADF and KPSS (Kębłowski & Welfe, 2004). The approach is not fully reliable, because time series can be stationary but a worsening budget financial situation can cause its default.

The next approach is based on the evaluation of the ability to pay off public debt. Public debt is defined as sustainable when the present discounted value of future primary budget surpluses is equal to the initial value of public debt (Blanchard et al., 1990). The approach assumes that future primary budget surpluses can be used to pay off the public debt. The main disadvantage of the approach is that it is based on future values of primary surpluses which must be forecasted. The experience proves that long-term forecasts of primary surpluses differ a lot compared to real values of the budget results.

Therefore, another approach, based on the analysis of the level of correlation between the level of debt and the amount of the primary surplus, was also proposed. Public debt is sustainable if it is positively correlated with a primary surplus (Bohn, 2005). The approach assumes that if public debt grows, increasing the primary surplus will ensure the possibility to pay off the debt in the future. This approach is currently the most used to assess public debt sustainability.

Disadvantages of the approaches presented above lean towards widening the analysis of the sustainability of public debt. A wide analysis of public debt sustainability will be undertaken, based on the integrated concept of sustainable development (Kiełczewski, 2021) and the widest concept of sustainable public finances (Cieślukowski, 2017). The analysis will concentrate on three aspects of public debt sustainability (Figure 1):

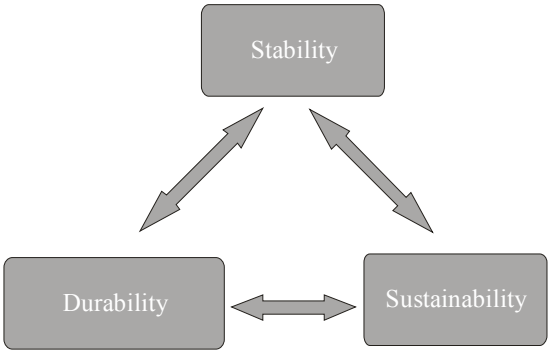

Figure 1. Three aspects of public debt sustainability

Source: (Piątkowski, 2022).

1) stability – public debt stability is understood as the short-term ability to settle liabilities in terms of liquidity and solvency,

2) durability – understood as the ability to ensure the implementation of public tasks in the future,

3) sustainability – understood as the use of public debt for the implementation of tasks in the area of sustainable development.

The widest approach combines other approaches and adds ecological and social aspects of sustainable development. There are no unambiguously adopted evaluation criteria for the additional aspects, hence the measures relating to the implementation of social and environmental goals of sustainable development will be indicated.

Research methods

Firstly, the analysis of legal solutions based on the desk-research principle was used in the article. Then, public debt sustainability assessment methods were used to assess the degree of sustainability of the central government subsector debt and the local government subsector debt. The stationarity analysis of time series based on the unit root test was used. The analysis was performed using the KPSS test in the GRETL program. Additionally, an analysis of correlation and regression between the variables of public debt and primary balance was performed. In the aspects that do not have a developed test method, it was proposed to use evaluation methods such as the European taxonomy and the analysis of quantity and value of green bond issues, the share of investment expenditure, and green tagging of expenditure. Due to the small scale of use of these tools, the available results and potential possibilities of their further application were indicated. The analysis was based on Eurostat data divided into central government and local government subsectors.

Discussion

The stability aspect is focused on the influence of debt on the financial stability of the state. The basic limitation of the debt of the central government subsector is the constitutional limitation of the debt level amounting to 3/5 of GDP (Konstytucja Rzeczypospolitej Polskiej, 1997, Art. 216). This limit has an important advantage. It is regulated in the Constitution – the most important legal act whose modification is very difficult. It requires 2/3 votes in the presence of at least half of the total number of deputies (Art. 235). This limitation should be analyzed from several points of view. Firstly, establishing the limit in the Constitution has a positive effect on the stability of public debt (Panfil, 2013). During the 25 years of the Constitution's validity, the value of public debt approached the constitutional limit several times. At that time, governments probed the possibility of changing or lifting the limit, but so far there

was no parliamentary majority willing to accept such a solution. This does not mean, however, that it is completely impossible. But the change is significantly hampered (Działo, 2014, pp. 228–229). Secondly, the construction of the limit of 3/5 GDP sets only the upper limit of the debt, disregarding the financial situation of the central government subsector and the costs of public debt servicing. In consequence, subsector entities incur debts until the limit begins to limit the possibility of incurring new liabilities. Then, the periods of good economic conditions make it possible to "outgrow" the debt, and the periods of worse economic conditions cause the debt of the subsector to approach the limit again (Działo, 2014, p. 231). Thirdly, the central government needs to take into consideration the debts of the other subsectors on which it has limited influence. It can influence legislation on local government indebtedness, but it has no direct control over their budgets. This aspect may adversely affect the sustainability of public debt.

The second limit of debt of the central government subsector includes the statutory regulations on fiscal policy: the prudential thresholds included in the Public Finance Act and the expenditure rule. The influence of the regulation on the sustainability of debt is not unequivocal. Firstly, when the limits are exceeded, the government is obligated to take the actions provided for in the act (such as no deficit or limited deficit, no increase in salaries in the budgetary sphere), which are not popular in society. Taking them into consideration has a positive effect on the subsector's debt stability. On the other hand, the government has the temptation to manipulate prudential thresholds. Historical examples show that the Polish government circumvents restrictions. For example, the validity of the threshold was suspended in 2013 (Ustawa z dnia 26 lipca 2013 r.), the next threshold of the 50% GDP was deleted from the Public Finance Act (Ustawa z dnia 8 listopada 2013 r.), or the statutory definition of public debt was changed a few times. The activities of the government are on the borderline of creative accounting and have a negative impact on debt stability. In consequence, the debt of the central government subsector in Poland regularly approaches 60% of GDP (Figure 2). The fact that fiscal rules are in force should have a stabilizing effect on the balancing of public debt, but the imperfections of their structure (Walasik, 2016, pp. 84–86) and the possibility of changing cause that their impact on debt stability is small and rather negative. Therefore, a sudden breakdown of the economic situation caused by unexpected factors (e.g. the coronavirus pandemic) may increase the bond issue and decrease GDP. Such a situation leads to an explosion of debt. Also, a sudden and significant rise in the interest rates, caused by a loss of confidence in financial markets, or an increase in inflation, may cause the constitutional limit of debt to be exceeded.

The third element that should be taken into consideration is the fact that the central government subsector, unlike the local government subsector, has real possibilities of increasing the tax burden. Passing new taxes or increasing the rates of taxes, according to the constitution, takes place by statute (Konstytucja Rzeczypospolitej Polskiej, 1997, Art. 84). It creates the possibility of collecting the necessary revenues in a situation of

a large increase in financial needs (although an economic crisis may make it difficult to obtain real effects). For example, the Act on tax on certain financial institutions was passed when the government decided to increase spending considerably (Ustawa z dnia 15 stycznia 2016 r.). The possibility has a positive effect on the central government's credibility, and, thus, on the stability of this part of the debt. However, it increases the moral hazard of the subsector and can cause the overuse of debt instruments by the government, as it creates an illusion of credibility of the subsector.

The influence of the political cycle on responsibility for debt sustainability is the fourth element that should be taken into consideration. Political reality indicates that undertaking financial decisions in the central government subsector is under a strong influence of the electoral cycle. Parliament and government politicians are much less responsible for decisions contributing to the increase in debt than local politicians. Literature pays particular attention to democratic and moral responsibility (Zawadzka-Pąk, 2016). In the case of the central government subsector, voters do not identify the deputies with their decisions, which are the result of party mechanisms. This is a factor that negatively affects the sustainability of public debt.

The stability aspect of debt of the local government subsector is regulated differently than that of the government subsector. That fact influences strongly the sustainability of this part of the debt. Firstly, the indebtedness of local government units is limited not only by general limits but also by limits related to the financial situation of individual local governments. The individual debt ratio provided for in Art. 243 of the Act of 27 August 2009 on public finance limits the indebtedness of individual local government units much stronger than the constitutional limitation (60% of GDP). The ratio replaced a much stricter debt limit at the level of 60% of revenue, which very strongly limited the indebtedness of local governments, especially large cities with a stable financial situation (central government subsector is indebted on the level of 222% of revenues). However, the new index is also under discussion since its implementation (Marchewka-Bartkowiak & Wiśniewski, 2012; Owsiak, 2018). The main disadvantage of the index is that it is based on historical data, which, according to research, does not reflect the current revenue of even 70% of local governments and significantly differs from the credibility of local governments assessed using other methods (Kowalska & Legutko, 2018). In consequence, not all local governments can issue as much debt as they expect. According to the data of the Ministry of Finance, at the end of the year 2021, 95% of local governments in Poland were indebted. A considerable part of them was indebted on a minimum level: debt of 95% of them was below 40% of the revenues realized in 2021. There are opinions that individual debt ratio does not guarantee the stability of local government units because it can be circumvented. The strongest local governments (cities with poviat rights and voivodeships, 100% of which are indebted) use debt instruments more often than smaller local governments (*Informacja…*, 2022, pp. 35–39). The higher stability of debt of the local government subsector confirms also the fact that local governments work out budget surplus much more often than the state budget (it was not noted since the year 1989). The surpluses can be used to

pay back debts. In the year 2021, only 12.8% of local governments reported a budget deficit (*ibid*.). However, it should be underlined that local governments influence on their revenues in a very limited range. The vast majority of the revenues come from transfers from the state budget or participation in central taxes. In consequence, the income potential of local governments is much smaller. That is why the legislator established much more restrictive debt limits for local governments. In consequence, the debt level of the local government subsector is thirteen times lower than that of the government subsector (Figure 2). The low relative level of debt results in low costs of debt servicing. The risk of excessive debt and the inability to service debt is also much lower than in the case of the central government subsector. The individual debt ratio strongly limits the possibilities of self-government indebtedness. Linking to the financial situation of the local government (in a more or less effective way) positively influences the sustainability of public debt.

Secondly, the local government subsector consists of 2,807 units. Debt in the local government subsector is dispersed. Including the fact linking the possibility of indebtedness with the financial situation of local governments risk of insolvency in the subsector is much smaller. The default of individual units has a relatively small negative impact on the sustainability of the public debt as a whole. Such situations occurred in Poland only once in the case of Ostrowice *gmina*. According to the analysis, the difficult financial situation concerned only a small part of local governments (according to the INC Rating report, 1.5% in 2016, and according to the data of the Ministry of Finance, at the end of 2021, only 0.5% of local governments did not meet the assumptions of the individual indicator debt). Debt dispersion and its dependence on local government revenues have a positive effect on the balance of the public debt. There is also a risk related to changes in the tax system which can cause insolvency of a large group of local governments but such changes would be against the Constitution. Thus, the risk related to the insolvency of the local government subsector is lower than in the case of the government subsector.

Third, the local government subsector is unable to influence the level of debt limits. The parliament is responsible for setting the limits. The parliamentary majority is usually related to the government subsector (Ładysz, 2013). In consequence, the scale of moral hazard is much smaller in local government units. The units use the debt instruments more rationally and responsibly. This does not mean that local governments do not try to circumvent the limits. However, their possibilities are much smaller. Some authors point out that the inflexibility of the individual debt ratio prompts local governments to push debt beyond the budgetary economy (Owsiak, 2018, p. 169; Filipiak, 2018, p. 79). The example of Ostrowice *gmina* shows that officers responsible for the insolvency of local government were sentenced to prison punishment (*7 lat więzienia…*, 2022). It is difficult to find a similar example in the case of government insolvency in any country. Therefore, the scale of moral hazard in this subsector is much smaller than in the case of the central government subsector, which has already suspended the application of the prudential thresholds (Ustawa

z dnia 26 lipca 2013 r.) and the expenditure rule (Ustawa z dnia 11 sierpnia 2021 r.) and considered the possibility of abolishing the constitutional rule (Szymczak, 2022). Thus, the inability to influence the limits of debt (with their proper construction), is a factor in improving the sustainability of the local government subsector debt.

Fourth, the practice of debt management indicates that the local governments use debt instruments in a much more responsible way. The authorities and members of the council are responsible to the inhabitants of the area and also live in this area. The requirement which candidates for council needs to fulfil is to reside in the *gmina* (city/poviat/voivodeship). This circumstance reduces the tendency to get into debt. There is no such requirement in the case of parliament deputies, and practice shows that they often live far from their electoral place. In consequence, the level of democratic and moral responsibility is much lower. That fact positively influences the sustainability of the debt of the local government subsector.

The next aspect of the sustainability of public debt is durability. The most important issue is to ensure the supply of public services. It depends on the primary balance of the subsector, the burden of debt service costs, and long-term liabilities. The regulations that influence the durability of debt are mainly related to the practice of debt management, less to legal requirements. In the case of the central government subsector, some differences compared to the local government subsector can be pointed out.

First, central government debt is a constant burden for the central government subsector for several dozen years. Its size increases in Poland every year (except for 2014, when some of the Treasury bonds owned by pension funds were taken over). Two reasons for that fact can be pointed out. The first one is the regular occurrence of budget deficits. The second one is that strategies of public debt management do not anticipate reducing the level of debt in absolute terms. A decrease in relative values of debt is possible thanks to the "growing out" of debt when the nominal GDP grows faster than the nominal value of debt. The main goal of the strategies of public debt management is the minimization of debt servicing costs in the long term with an acceptable level of risk (*Strategie zarządzania długiem*, 2002–2022). The central government subsector needs to finance the costs of debt servicing every year. The costs depend on the size of the debt and the level of interest rates. In Poland, servicing of Treasury debt costs from 5.0% in 2021 (the lowest interest rates in history) to 13.2% of state budget expenditure in the years 2012–2013 (*Wskaźniki makroekonomiczne*, 2022). High inflation and increase suggest that share of these expenses will increase, negatively affecting the sustainability of debt of the central government subsector.

Second, the debt management of the central government subsector is based on a continuous rollover of liabilities. In consequence, gross borrowing requirements are significant (in the years 2010–2021 they amounted to between PLN 120 and PLN 189 billion annually) (*Dług publiczny 2020…*, 2021, p. 92). In the following years, borrowing needs will increase due to the increase in debt and debt servicing costs. The impact of debt refinancing on the durability of debt of the central government subsector will be significant.

Third, the model of debt management is based on maintaining the relation of debt to GDP at a constant level or slightly lowering it in times of good economic conditions and significantly increasing the level of debt in periods of economic crisis. In consequence, the debt of the central government subsector rises rapidly after every crisis. The crisis of 2000–2001 caused the increase in debt level by 9 percentage points (from 36.0 to 45.0% of GDP) before its level stabilized. Another crisis of the years 2008–2009 resulted in an increase in the debt by 11 percentage points (from 42.7 to 53.7% of GDP). Finally, the crisis related to the coronavirus pandemic caused an increase in debt by 11.8 percentage points (from 45.1 to 56.9% of GDP) (Eurostat, 2022). Increases in debt levels are getting bigger and faster. After the crisis, the debt level stabilizes at new levels (over 40% of GDP, nearly 50% of GDP, and around 55% of GDP, respectively). Such dynamics of debt and the model of debt management influence negatively the sustainability of the debt.

Fourth, the central government subsector is responsible for long-term liabilities related to, for example, the financing of pensions. Demographic changes like the aging of the society, and increasing life expectancy mean that the costs of pensions will increase (Pleśniak, 2014). A similar problem will be related to the healthcare system. In consequence, government debt will likely grow faster to meet the obligations of the central government subsector. The obligations are a serious risk to the sustainability of debt.

The local government subsector manages its debt using different methods that result from a different scale of activity, regulations, aims, and motivations. Firstly, the debt of single local government units fluctuates much more than total public debt, especially in the case of smaller local governments. As a result, smaller local governments are not permanently burdened by debt and the cost of its servicing. Debt instruments are one of the options for financing the implementation of tasks, not a permanent element. Changes in local government debt are related to the cycles of EU funds usage. Local governments finance their contribution to investment projects using debt instruments. After a few years, the local governments pay back part of the debts to be ready for the next investments. Such a model of debt management positively influences the durability of local governments.

Secondly, the debt of local governments is mostly financed by banks [in 2021 share of banks was 95.5% (*Informacja…*, 2022, p. 36)]. This form of debt financing usually requires regular debt repayment, which is financed from current revenues. Local governments are allowed to issue debt to finance property (mainly investment) expenditures. That fact has a positive influence on the sustainability of the debt of the local government subsector. However, "rolling over" the debts is also used as a method of debt management by local government units. The scale of "rolling over" increased after the introduction of the individual debt ratio. That fact may lead to the consolidation of this part of the debt and an increase in the costs of its servicing (Wójtowicz, 2017, p. 486). However, not all local government units decide to "roll over" their debts. The smaller ones try to pay back their debts not to be burdened

with their servicing. In such a situation, the risk of default of individual local governments is much lower.

Third, local governments are less burdened with the costs of debt servicing due to the lower level of debt. Expenditures for debt servicing costs ranged from 0.4% of their spending to a bit more than 1% in the analyzed period (about 10–13 times less than in the central government sector) (*Informacja…*, 2022, pp. 28–34 and previous information). In consequence, durability of the local government services is not at risk due to the debt of the subsector. The fact results positively in debt sustainability.

Fourth, the structure of long-term obligations of local governments is different than in central government sector. The obligations are imposed by the acts of law and focus on issues such as education or the maintenance of local infrastructure. The weakening of the revenue potential of local governments may lead to a more difficult realization of tasks or a smaller range of public goods provided (Kwiatkowski et al., 2021, pp. 70–75). But it should not increase the debt of local government units because current spending cannot be financed by the debt. In consequence, the debt of the local government subsector does not constitute such a significant threat as, for example, liabilities related to future pensions.

The aspect of support of sustainable development is the weakest point of debt sustainability in the central government subsector. Firstly, funds raised from issued debt are not linked to any particular type of expenditure. It is difficult to identify the level of sustainability of budget expenditure. There are concepts of marking budget expenses that follow rules of sustainable development – the so-called green tagging. Lack of experience in the implementation of the method, and the lack of full implementation of the performance budget make these analyses difficult (Kostecki, 2022, pp. 52–53). The second method of tagging expenditures is the so-called European taxonomy. The taxonomy will be an additional motivation to undertake activities "green" expenditure (*ibid*., pp. 60–66). But the methods will be effective tools for sustainable development in the future. Moreover, green tagging and European taxonomy deal with the environmental aspect of sustainable development only. The social aspects of sustainable development are omitted in the methods. Hence, the structure of government expenditure financed by public debt does not influence positively on the sustainability of debt.

Secondly, the share of investment expenditures in the state budget is much smaller than in local government units. Investment expenditures amounted from 1.7% in 2008 to 6.6% in 2020 in state budget (the main fund of the central government subsector). The expenditure of special-purpose funds, such as the Government Road Development Fund or the National Environmental Protection Fund, increases the share of investment expenditure by less than 1 percentage point [calculation based on GUS data included in: (*Roczniki Statystyczne…*, 2002–2021)]. The factor also does not influence positively on debt sustainability.

Third, the use of financial instruments related to the implementation of sustainable development goals is still limited in the central government subsector. For example, the so-called green bonds for which the spending target is known and linked to the

achievement of the SDGs are not used yet (*Raport Perspektywy…*, 2021, pp. 55–57). Hence, it can be presumed that the share of pro-environmental projects in the sector's investment expenditure is small. Thus, the influence of factors related to supporting sustainable development on the debt of the central government subsector is small.

The local government subsector emphasizes the aspect of support of sustainable development more clearly. Firstly, local government units may only issue debt for investment purposes (Ustawa z dnia 27 sierpnia 2009 r., Art. 242). Such regulation results that the funds obtained from debt instruments are not allocated to current expenses. That fact positively affects the sustainability of the debt of the local government subsector.

Secondly, the share of investment expenditure in the budgets of local government units is much larger than in the case of the state budget. The share varies over time but ranges from 12.5% in 2016 to even over 25% of the expenditure of local government units in 2010 (share in budgets of individual local government units can be even over 30%) [calculation based on GUS data included in: (*Roczniki Statystyczne…*, 2002–2021)]. The majority of these expenses are infrastructure investments. As a result, the debt of the local government subsector can be considered much more sustainable than the debt of the central government subsector.

Thirdly, the investment expenditure of local government units is often related to the development of local infrastructure. Due to the significant role of the support of European Union funds in the implementation of the investments, the aims of sustainable development are taken into consideration at the stage of their preparation. The European Union requires realizing its aims. For example, financing road investments in cities in the 2014–2020 budget perspective required preferences for collective transport (e.g. by adding bus lanes).

Fourthly, local government units more often try to use instruments related to promoting sustainable development than the central government. For example, Łódź is the only public unit in Poland that issued green bonds (*Raport Perspektywy…*, 2021, p. 55). Issuing the green bonds requires a clear declaration of the purpose of the collected funds and a sustainability certificate for investments financed with them. It costs more than traditional issues but gives prestige and promotion to the city. It also gives access to investment funds related to sustainable development. The issue in Łódź is the first in Poland and is relatively small-scale, but if other local governments use the example, it will positively affect debt sustainability.

Results

The analysis above shows a significant differentiation of legal and organizational solutions between the debt of the central government subsector and the local government subsector. The differences influence the real amounts of debt and its sustainability which will be assessed below.

The level of indebtedness of both analyzed subsectors was presented in Figure 2. The debt levels are radically different. The debt of the local government subsector is fourteen times smaller than the debt of the central government subsector. For comparison, the local government subsector has only 35% fewer funds during the year than the central government subsector. The debt of the local government subsector increased in the analyzed period, but it reached relatively low levels. The debt of the central government subsector was close to the constitutional limit for almost 10 years, and in 2020, it reached 56.9% of GDP. Moreover, each subsequent crisis permanently increases the level of debt. It can be predicted with a high probability that another crisis may result in exceeding the constitutional boundary.

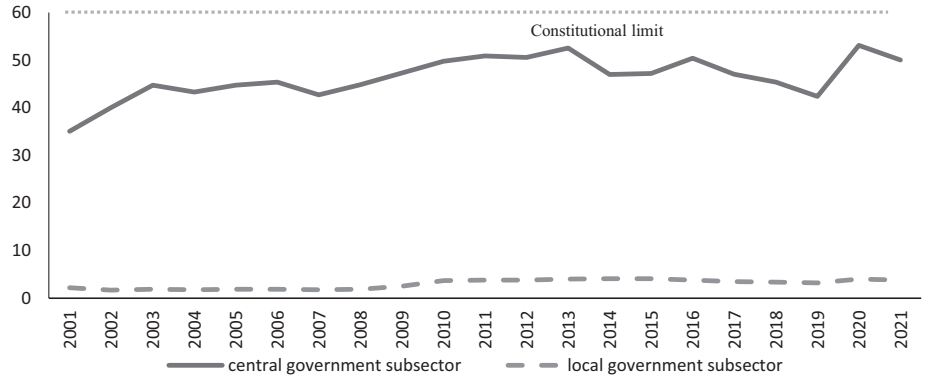

Figure 2. The debt of the central government and local government subsectors (in % of GDP)

Source: Author's own study based on (*Zadłużenie*..., 2022).

The situation concerning the budget balance also differs in both analyzed subsectors (Figure 3). The central government subsector recorded budget deficits in all years of the analyzed period. The deficits increased significantly during all crises. There was an improvement in the years 2018–2019, but the coronavirus crisis resulted in the highest budget deficit in the year 2020 (7.8% of GDP). In consequence, the budget balance of the central government subsector negatively affects the sustainability of public debt. The local government subsector periodically recorded both budget deficits and surpluses in the analyzed period. The size of both deficits and surpluses was incomparably smaller than in the central government subsector. As a result, a conclusion can be drawn that the budget balance of local government units makes a much smaller impact on the sustainability of debt.

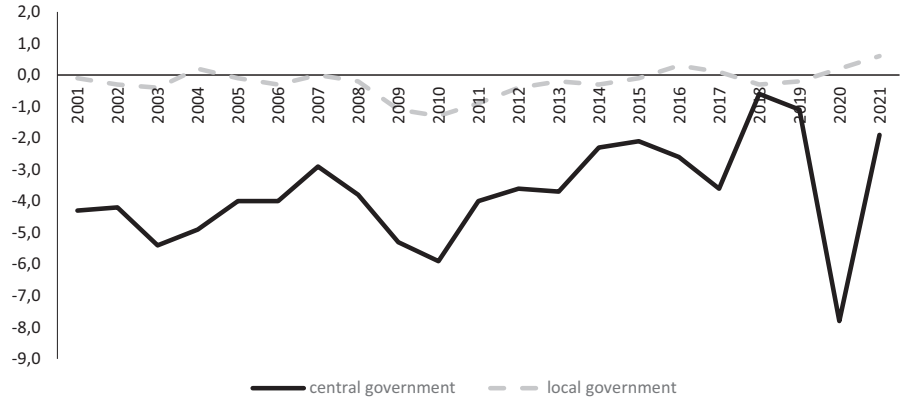

Figure 3. Balance of the central and local government subsector (in % of GDP)

Source: Author's own study based on (Eurostat, 2022).

The third indicator strongly related to the sustainability of public debt is the primary balance (Figure 4). Primary surpluses allow to pay back the debt of the subsector. Regular primary deficits increase the debt. The central government subsector in Poland did not record primary surpluses in the analyzed period. As a result, the primary balance of the subsector negatively affects the sustainability of debt. This is particularly important for the sustainability of whole public debt, as the central government subsector is responsible for more than 90% of the public debt. The local government subsector periodically recorded primary surpluses and primary deficits, which is a consequence of responsible fiscal policy and low costs of debt servicing. The recorded primary surpluses are not able to reduce the amount of debt of the subsector. However, the negative impact of the primary balance of the local

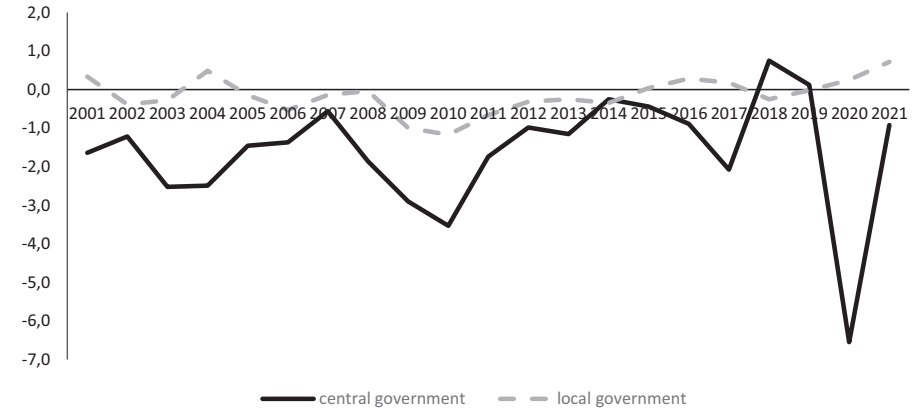

Figure 4. Primary balance of the central and local government subsectors (in % of GDP)

Source: Author's own study based on (Eurostat, 2022).

government subsector on the sustainability of public debt is smaller than the primary balance of the central government subsector.

The stationarity of time series is one of the methods of assessing debt sustainability in the aspect of debt stability. Due to the small number of observations, the use of the ADF test was impossible. Therefore, the KPSS (Kwiatkowski–Phillips–Schmidt–Shin) test was used. For the time series of public debt in both subsectors in Poland (2001–2021), the test results are inconclusive (Table 1). In the case of the test variant without trend, the results for both subsectors indicate the non-stationarity of the series. However, in the case of using trend tests, both series are stationary, although the value of the statistics slightly exceeds the critical value. Analysis of time series suggests that trend is in debt of local government subsector. Then the use of the KPSS test with trend seems to be more justified in that case. The results suggest that the debt of the local government subsector is (slightly) sustainable and the debt of the central government subsector is not sustainable.

Table 1. Results of stationarity analysis of public debt series for the central and local government subsectors

Null hypothesis: stationary process. KPSS test for the centr_gov variable T = 20 Delay order parameter = 2 Test statistics = 0.633636 10% 5% 1% Critical value: 0.357 0.462 0.694 Interpolated *p* value: 0.020	Null hypothesis: stationary process. KPSS test for the local_gov variable T = 20 Delay order parameter = 2 Test statistics = 0.6506 10% 5% 1% Critical value: 0.357 0.462 0.694 Interpolated *p* value: 0.020
Null hypothesis: stationary process. KPSS test for centr_gov (with trend) T = 20 Delay order parameter = 2 Test statistics = 0.137423 10% 5% 1% Critical value: 0.357 Interpolated *p* value: 0.074	Null hypothesis: stationary process. KPSS test for local_gov (with trend) T = 20 Delay order parameter = 2 Test statistics = 0.14745 10% 5% 1% Critical value: 0.357 0.462 0.694 Interpolated *p* value: 0.054

Source: Author's own study using the GRETL program.

The analysis of the correlation between the primary surplus and the public debt is the second method that is used to assess the sustainability of debt in the aspect of durability. It can be assumed that the primary surplus should increase when the level of debt increases. It should ensure the possibility of debt repayment in the future. Regression functions (Figure 5) determined for both subsectors indicate a negative correlation between both values. However, the R^2 values (0.0691 and 0.0088) indicate in both cases a very small degree of match between the model and the data. The parameters of the models are statistically insignificant (standard errors 0.06 and 3.16 for central government and 0.09 and 0,32 for local government). The correlation coefficients are also negative and amount to: -0.26 for the central government subsector and -0.09 for the local government subsector. The results suggest a negative correlation between the variables. Although in the case of the local government subsector the correlation coefficient is close to zero. Moreover, the government subsector recorded the primary surplus only two times out of 21 analyzed years. In the case of the local government subsector, surpluses occurred six times. These results indicate the unsustainability of the debt of both subsectors.

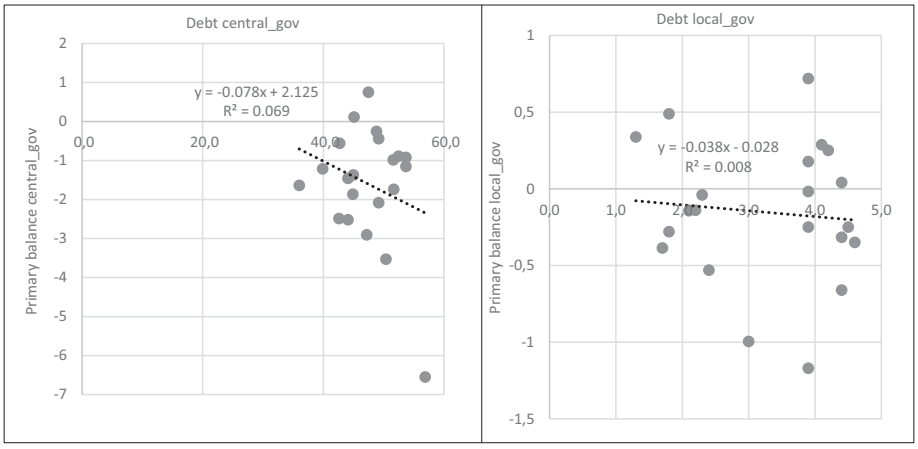

Figure 5. Regression results for the variable government debt and primary balance (in % of GDP)

Source: Author's own study using the GRETL program.

Conclusions

The conducted analysis reveals significant differences between the legal and organizational solutions related to public debt in the central government and local government subsectors. The central government subsector takes advantage of the much greater number of opportunities for indebtedness. That situation is justified by the fact that the subsector is able, to a large extent, to determine the growth of its revenue. In consequence, the central government subsector is much more indebt-

ed than the local government subsector. Moreover, the long-term liabilities of the subsector and the structure of its debt-financed expenditure indicate much lower sustainability of this part of the public debt. On the contrary, the local government subsector is much less financially independent. The possibility to influence its revenue is significantly limited. In consequence, the subsector must fulfill much stricter debt limits than the central government subsector. Analyzed data shows that the local government subsector is much less indebted. The structure of expenditures and the degree of implementation of the SDGs also confirm that despite the lower impact on its revenue, the debt of the local government subsector can be considered much more sustainable. It could be recommended to apply some instruments similar to local government regulations. For example, limitation of debt related to revenue or operational balance of state budget, expenditures financed by public debt related to sustainable aims, higher responsibility of members of parliament, or limitation in rolling over debt could decrease the level of central government subsector and increase the sustainability of debt.

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